Amendments to the Claims

This listing of claims will replace all previous versions, and listings, of claims in the application.

1. (currently amended) Method for the production of Al_2O_3/SiC nanocomposite abrasive grains, comprising the steps of:

mixing an aluminum-oxide containing sol with sinter additives and SiC nanoparticles to obtain a mixture; and

subsequently gelling, drying, calcinating and sintering the mixture, the sintering being conducted by heating the mixture in the range between 1300°C and 1600°C,

the foregoing steps being sufficient in themselves to produce the Al_2O_3/SiC nanocomposite abrasive grains.

2. (previously presented) Method according to Claim 1, wherein the aluminum-oxide containing sol contains as a solid component superfinely dispersed aluminum oxide monohydrate of the Boehmite type, aluminum alkoxides, aluminum halogenides and/or aluminum nitrate.

3. (previously presented) Method according to either Claim 1 or Claim 2, wherein the SiC nanoparticles are mixed in an amount of between 0.1 and < 5 mol %, preferably in the range of 0.3 and 2.5 mol % relative to the aluminum contents of the mixture, calculated as Al_2O_3.

4. (previously presented) Method according to either of Claims 1 or 2, wherein that prior to the gelling, sintering additives in the form of crystallization seeds, crystal growth inhibitors and/or other modifying components that influence the sintering process are added.

5. (previously presented) Method according to Claim 4, wherein fine-particled α aluminum oxide is used as crystallization seed.

6. (previously presented) Method according to either of Claims 1 or 2, wherein the gelling of the suspensions occurs by increasing or decreasing the pH value, through aging, the addition of electrolytes, increased temperature, and/or concentrating the solution.

7. (previously presented) Method according to either of Claims 1 or 2, wherein the drying of the gel is carried out in a temperature range between 50 °C and 120 °C, with subsequent calcination between 500 °C and 800 °C, and sintering in a temperature range between 1300 °C and 1600 °C.

8. (previously presented) Method according to Claim 7, wherein the sintering is done in a temperature range between 1380 °C and 1500 °C.

9. (previously presented) Method according to Claim 7, wherein the sintering is carried out under inert conditions.

10. (previously presented) Method according to either of Claims 1 or 2, wherein comminution to the desired grain size is done before or after sintering.

11. (currently amended) Al_2O_3/SiC nanocomposite abrasive grain with a hardness of > 16 GPa, a density of > 95% of the ~~theory~~ theoretical limit, and an SiC portion of between 0.1 and < 5 mol %, relative to the Al_2O_3 matrix, wherein the SiC particles are present in the Al_2O_3 matrix as well as intragranularly and the abrasive grain shows a performance factor LF_{25} > 75 % in the single-grain scratch test.

12. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to Claim 11, wherein the SiC portion preferably amounts to between 0.3 and < 2.5 mol %, relative to the Al_2O_3 matrix.

13. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to either of Claims 11 or 12, wherein the SiC particles are predominantly present intragranularly in the Al_2O_3 matrix.

14. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to either of Claims 11 or 12, wherein the Al_2O_3 crystals of the matrix show mean diameters of between 0.2 μm and 20 μm.

15. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to either of Claims 11 or 12, wherein the Al_2O_3 matrix has a submicron structure and a mean particle size of < 1 μm, preferably < 0.5 μm.

16. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to Claim 15, wherein coarse Al_2O_3 crystals are formed in the submicron Al_2O_3 matrix.

17. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to Claim 16, wherein the coarse Al_2O_3 crystals have a mean diameter of > 2 μm, preferably > 5 μm.

18. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according one of Claims 16 or 17, wherein the coarse Al_2O_3 crystals have an oblong shape.

19. (previously presented) Al_2O_3/SiC nanocomposite abrasive grain according to either of Claims 16 through 18, wherein the coarse Al_2O_3 crystals have a length/width ratio of between 2:1 and 10:1, preferably between 4:1 and 6:1.

20. (previously presented) Grinding belts or grinding disks, comprising Al_2O_3/SiC nanocomposite abrasive grains according to Claim11 in combination with backing substrates or materials.

Amendments to the drawings

The attached 3 sheets of drawings include changes to Figures 1-4. These sheets, which include Figures 1-4, replace the original three sheets including Figures 1-4. In Figures 1 and 2, the German writing has been replaced by English writing. In Figures 1-4, the header has been corrected.

Attachments: Replacement Sheet
Annotated sheet showing changes